5602. The control assembly includes pneumatic pathways that interface with a receiving surface through which pump cassette **5602** is operated. The receiving surface may be, without limitation, a bezel gasket that is part of a bezel assembly. During operation, pump cassette **5602** is aligned and pressed against the bezel gasket by a movable member. Air lines connected to the bezel assembly are controlled pneumatically, and used to displace membranes of the bezel gasket to operate the various valves and chambers of pump cassette **5602**.

[0218] FIG. **46** shows a conductivity sensor probe **5900** for use in pump cassette **5610**, in accordance with a particular embodiment of the invention. Without intending to be limited, any of the various accessory pumps or pumping means described, for example, in FIGS. **1**A, **10**, **12**C, **13**, **14**B, **57** (below) and elsewhere throughout this application, may utilize pumps designed in accordance with pump cassette **5502** as described in FIGS. **43-46**.

[0219] Alternative embodiments of the system may employ fluid management system pumps, such as reciprocating positive-displacement pumps wherever an accessory pump is required or desired. For example, siphon pump **32** (see FIGS. **10**, **12**C and **13**), intake pump **00** (see FIG. **1**A), circulating pump **43**BB (see FIG. **14**B), and pumps for the blowdown stream **43**, the condensed product **41**, the air through the HEPA filter, the volatile mixer **23** (see FIG. **14**A), for scale control and pressure control, for adding liquid to the liquid ring pump and pumping mechanisms inline with the cold intake, or in communication with the fluid distribution manifolds, may all be a reciprocating positive-displacement pod. Such pumps are described thoroughly in U.S. Patent Application Ser. No. 60/792,073 for Extracorporeal Thermal Therapy Systems and Methods" filed Apr. 14, 2006, docket number 1062/E44, as mentioned above, the contents of which are hereby incorporated by reference herein.

[0220] In one embodiment the pod pump is a reciprocating positive-displacement pump with a hemispherical rigid chamber wall; a flexible membrane attached to the rigid chamber wall, so that the flexible membrane and rigid chamber wall define a pumping chamber; an inlet for directing flow through the rigid chamber and an outlet for directing flow through the rigid chamber wall out of the pumping chamber. A reciprocating positive-displacement pump is provided comprising a rigid hemispherical chamber wall; a flexible membrane attached to the rigid chamber wall, so that the flexible membrane and rigid chamber wall define a pumping chamber; an inlet for directing flow through the rigid chamber wall into the pumping chamber in a direction that is substantially tangential to the rigid chamber wall; and an outlet for directing flow through the rigid chamber wall out of the pumping chamber in a direction that is substantially tangential to the rigid chamber wall. In other embodiments, the reciprocating positive-displacement pump also includes a rigid limit structure for limiting movement of the membrane and limiting the maximum volume of the pumping chamber, the flexible membrane and the rigid limit structure defining an actuation chamber. The rigid limit structure is preferably adapted to limit movement of the flexible membrane such that, when the pumping chamber is at maximum volume, the rigid chamber and the flexible membrane (which will be urged against the rigid limit structure) define the pumping chamber as a spherical volume. The rigid limit structure is preferably a hemispherical limit wall that, together with the flexible membrane, defines a spherical actuation chamber when the pumping chamber is at minimum volume.

[0221] As described above, various embodiments of this invention may advantageously provide a low-cost, easily maintained, highly efficient, portable, and failsafe liquid purification system that can provide a reliable source of drinking water for use in all environments regardless of initial water quality. The system of the present invention is intended to produce a continuous stream of potable water, for drinking or medical applications, for example, on a personal or limited community scale using a portable power source and moderate power budget. As an example, at the desired efficiency ratio, it is envisioned that the present system may be utilized to produce approximately 10 gallons of water per hour on a power budget of approximately 500 watts. This may be achieved through a very efficient heat transfer process and a number of sub-system design optimizations.

[0222] Knowledge of operating temperatures, TDS, and fluid flows provides information to allow production of potable water under a wide range of ambient temperatures, pressures, and dissolved solid content of the source water. One particular embodiment may utilize a control method whereby such measurements (T, P, TDS, flow rates, etc) are used in conjunction with a simple algorithm and look-up table allowing an operator or computer controller to set operating parameters for optimum performance under existing ambient conditions.

[0223] Embodiments of the present invention may be described and used as indicated in the following listing, which is neither exhaustive nor limiting:

What is claimed is:

1. A liquid distillation system comprising:

an input for receiving untreated liquid;

an evaporator/condenser comprising a plurality of parallel core evaporator tubes;

the evaporator/condenser coupled to the input for transforming the untreated liquid to vapor;

a vapor pump for compressing the vapor;

the evaporator/condenser for transforming compressed vapor into a distilled liquid product; and

a conductivity sensor to measure the electrical conductivity of the distilled liquid product, wherein the conductivity sensor is an inductive sensor,

wherein if the electrical conductivity of the distilled liquid product is below a pre-set level, a signal mechanism is triggered to pump a volume of at least one additive into the distilled liquid product.

2. The system according to claim **1**, further comprising a motor for driving the vapor pump, wherein heat supplied to the evaporator/condenser originates in the motor.

3. The system according to claim **1**, the vapor pump further comprising a rotatable housing inside a fixed housing, the fixed housing and the rotatable housing each having a diameter such that the diameter of the rotatable housing is smaller than the diameter of the fixed housing.

4. The system according to claim **3**, further comprising at least one bearing between the rotatable housing and the fixed housing.

5. The system according to claim **4**, wherein the at least one bearing is a hydrodynamic bearing.

6. The system according to claim **1**, wherein the evaporator/condenser comprising a head chamber and the system